

Maryam Abdi-Oskouei

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EDUCATION

- Ph.D. - Environmental Engineering** 2013 - 2018
University of Iowa — Adviser: Dr. Gregory Carmichael
Thesis: *Improving Air Quality Prediction through Characterizing the Model Errors Using Data from Comprehensive Field Experiments*
- M.Sc. - Mining Engineering** 2011 - 2013
Missouri University of Science & Technology — Adviser: Dr. Kwame Awuah-Offei
Thesis: *Methods for Evaluating Effect of Operators on Dragline Energy Efficiency*
- B.Sc. - Mining Engineering** 2006 - 2011
Amirkabir University of Technology

RESEARCH EXPERIENCE

- University Corporation for Atmospheric Research (UCAR)** **Boulder, CO**
-Joint Center for Satellite Data Assimilation (JCSDA)
-Mesoscale & Microscale Meteorology Laboratory (MMM) Jan/2019 - present
Software Engineer/Scientific Programmer
- Developed testing framework for JEDI, WRF, and MPAS models
- University of Iowa** **Iowa City, IA**
-Center for Global and Regional Environmental Research (CGRER) Aug/2013 – Dec/2018
Graduate Research Assistant — Adviser: Dr. Gregory Carmichael
- Evaluated WRF-Chem performance in predicting ozone concentration along the Lake Michigan shore using measurements from LMOS field campaign
 - Developed an inverse modeling framework to constrain ethane emissions from oil and gas activities using WRF-Chem
 - Designed and performed operational meteorological and air quality forecasts (WRF-Chem and WRF-CAM5) in support for the LMOS and ORACLES field campaigns
 - Developed a python framework for automated running of WRF-Chem and WRF-CAM5 forecasts and real-time forecast validation for both operational and research modes
 - Developed MATLAB and NCL scripts for real-time forecast validation and visualization for LMOS, NASA KORUS-AQ, and ORACLES field experiments
- National Center for Atmospheric Research (NCAR)** **Boulder, CO**
-Atmospheric Chemistry Observations & Modeling (ACOM) 9-11/2017 & 4-6/2018
Visiting Graduate Assistant — Mentor: Dr. Gabriele Pfister & Dr. Frank Flocke
Project: *Impacts of WRF-Chem physical parametrization on prediction of ethane concentrations for oil and gas emissions*
- Evaluated the sensitivity of various meteorological variables and ethane in WRF-Chem to physical parametrizations
 - Performed comprehensive model validation using FRAPPÉ and DISCOVER-AQ field campaign measurements
- National Oceanic and Atmospheric Administration (NOAA)** **Princeton, NJ**
-Geophysical Fluid Dynamics Laboratory (GFDL) - Princeton University
CICS Summer Intern — Mentor: Dr. Vaishali Naik 6-7/2016
- Evaluated the representation of methane in the GFDL climate chemistry model
 - Performed statistical analysis on various suites of methane measurements

- Developed a novel data-driven method for evaluating the effects of operators' skills on dragline energy efficiency
- Analyzed the big data collected from mining equipment measurement systems

PEER-REVIEWED PUBLICATIONS

- ◇ **Abdi-Oskouei, M.** Carmichael, G.; Christiansen, M.; Ferrada, G.; Roozitalab, B.; Sobhani, N.; Wade, K.; Czarnetzki, A.; Pierce, R. B.; Wagner, T.; Stanier, C., "Sensitivity of meteorological skill to selection of WRF-Chem physical parameterizations and impact on ozone prediction during the Lake Michigan Ozone Study (LMOS)". *JGR Atmospheres* (2020). 10.1029/2019JD031971
- ◇ **Abdioskouei M.;** Adelman, Z.; Al-Saadi, J.; Bertram, T.; Carmichael, G.; Christiansen, M.; Cleary, P.; Czarnetzki, A.; Dickens, A.; Fuoco, M.; Harkey, M.; Judd, L.; Kenski, D.; Millet, D.; Pierce, B. R.; Stanier, C.; Stone, B.; Szykman, J.; Valin, L.; Wagenr, T; "2017 Lake Michigan Ozone Study (LMOS) - Preliminary Finding Report", Lake Michigan Air Directors Consortium (LADCO), 2018
- ◇ **Abdi-Oskouei, M.;** Pfister,G.; Flocke, F; Sobhani, N.; Saide, P., Fried, A., Richter, D., Weibring, P., Walega, J., Carmichael, G., "Impacts of physical parametrization on prediction of ethane concentrations for oil and gas emissions". *Atmospheric Chemistry & Physics*. (2018). 10.5194/acp-18-16863-2018
- ◇ **Abdi-Oskouei, M. &** Awuah-Offei, K. "Role of the Operator in Dragline Energy Efficiency". *Energy Efficiency in the Mineral Industry – Best Practices and Research Direction*, Chapter 10 (2018)
- ◇ **Abdi Oskouei, M. &** Awuah-Offei, K. "A method for data-driven evaluation of operator impacts on energy efficiency of digging machines". *Energy Efficiency* (2016): 1-12.
- ◇ **Abdi Oskouei, M. &** Awuah-Offei, K. "Statistical methods for evaluating the effect of operators on energy efficiency of mining machines." *Mining Technology* 123.4 (2014): 175-182.

DISSERTATION & THESIS

- ◇ **Abdioskouei, M.** "Improving Air Quality Prediction through Characterizing the Model Errors Using Data from Comprehensive Field Experiments" Dissertation to obtain Ph.D. in environmental engineering, University of Iowa (2018)
- ◇ **Abdioskouei, M.** "Methods for evaluating effect of operators on dragline energy efficiency." Thesis to obtain M.Sc. in mining engineering, Missouri University of Science & Technology (2013)

SELECTED PRESENTATIONS

Oral presentations

- ◇ "Testing Framework in JEDI", American Meteorological Society (AMS) conference, Boston, 2020
- ◇ "WRF-Chem Modeling of Lake Michigan Summertime Ozone Air Quality: Optimization of Meteorology and Its Impact on Air Quality Forecasts", Boston, 2020
- ◇ Invited Talk: "Meteorological and air quality forecasting using the WRF-CHEM model during the Lake Michigan Ozone Study (LMOS 2017) field campaign", Space Science and Engineering Center Seminar, University of Wisconsin-Madison, Madison, WI 2018
- ◇ "Meteorological and air quality forecasting using the WRF-Chem model during the LMOS 2017 field campaign", Meteorology and Climate-Modeling for Air Quality (MAC-MAQ) conference, Davis, CA 2017
- ◇ "Assessing the sensitivity of WRF-Chem performance to different physical parametrization during the FRAPÉ campaign", TropChem-ACOM Meeting , Boulder, CO 2017
- ◇ "Impact of oil and natural gas activities on regional air quality in Northern Front Range (NFR) area", FRAPPÉ Science Meeting, Boulder, CO, 2017
- ◇ "Understanding the Impact of oil and gas extraction activities on air quality in the Northern Front Range Metropolitan Area (NFRMA)", American Meteorological Society (AMS) conference, Seattle, WA, 2017

- ◇ “Methane in the GFDL climate chemistry model”, Geophysical Fluid Dynamics Lab (GFDL), Princeton, NJ, 2016
- ◇ “Evaluation of WRF local and non-local PBL schemes performance in prediction of tropospheric ozone”, Jakobsen Memorial Conference, Iowa City, IA, 2016
- ◇ “Understanding CH₄ and VOC emissions from natural gas activities”, University of Iowa Environmental Engineering and Science (EES) graduate seminar, Iowa City, IA, 2015
- ◇ “Methods for evaluating effect of operators on dragline energy efficiency”, Society of Mining and Engineering (SME) conference, Denver CO, 2013

Poster presentations

- ◇ “Constraining oil and natural gas emission in the northern front range (NFR) Colorado through a multiplatform inversion”, American Geophysical Union (AGU) Fall Meeting, San Francisco, CO, 2019
- ◇ “Meteorological air quality forecasting using the WRF-Chem model during the Lake Michigan Ozone Study (LMOS-2017) field campaign”, NASA-HAQAST Meeting, Madison, WI, 2018
- ◇ “Assessing the impact of oil and natural gas activities on regional air quality in the Colorado Northern Front Range using WRF-Chem”, American Geophysical Union (AGU) Fall Meeting, New Orleans, LA, 2017
- ◇ “Meteorological air quality forecasting using the WRF-Chem model during the Lake Michigan Ozone Study (LMOS-2017) field campaign”, American Geophysical Union (AGU) Fall Meeting, New Orleans, LA, 2017
- ◇ “Evaluate the representation of methane in the GFDL atmospheric chemistry model”, American Meteorological Society (AMS) conference, Seattle, WA, 2017
- ◇ “Understanding methane emission from natural gas activities using inverse modeling techniques”, College of Engineering Research Open House, Iowa City, IA, 2016
- ◇ “Understanding methane emission from natural gas activities using inverse modeling techniques”, American Geophysical Union (AGU) conference, San Francisco, CA, 2015

AWARDS & FELLOWSHIPS

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| ◇ Full Tuition Award — University of Iowa | 2013-2018 |
| ◇ Ballard Seashore Dissertation Fellowship | 2018 |
| ◇ NCAR/ACOM Visitor Program Grant | 2018 |
| ◇ CGRER Research Award | 2017 |
| ◇ Best Poster Presentation Award, University of Iowa Research Open House | 2017 |
| ◇ Midwest Big Data Hackathon Award, <i>designed web-based software "Weather forecast for your road trip"</i> | 2016 |
| ◇ NCAR Advanced Study Program (ASP) Colloquium Fellowship | 2016 |
| ◇ NOAA Cooperative Institute for Climate Science Summer Fellowship | 2016 |
| ◇ NCAR travel grant for NCL workshop | 2015 |

TECHNICAL SKILLS

- ◇ Skilled in numerical weather prediction modeling and regional and global chemical transport modeling using WRF, WRF-Chem, and FLEXPART
- ◇ Competent in inverse modeling and data assimilation techniques including 3DVar, 4DVar, GSI, and Ensemble Kalman Filter
- ◇ Proficient in Python, C++, Fortran90, UNIX, and Shell scripting (Bash, Tsch)
- ◇ Skilled in earth science data visualization using NCL, GrADS and IDL, and statistical analysis using MATLAB, Python, SAS and R
- ◇ Experienced with HPC techniques such as MPI, and OpenMP using Fortran90, C, and C++
- ◇ Skillful in version-control software and source code management with Git
- ◇ Solid background in numerical modeling
- ◇ Familiar with atmospheric models at various scales including: GFDL-AM, MPAS, CESM, GEOS-Chem, and CMAQ

SELECTED PROFESSIONAL TRAININGS

- ◇ NCAR ASP Summer Colloquium: Advances in Air Quality Analysis and Prediction — Boulder, CO — Aug 2016
- ◇ Gridpoint Statistical Interpolation (GSI) and Ensemble Kalman Filter(EnKF) Community Workshop at NCAR — Boulder, CO — Aug 2015
- ◇ Weather Research and Forecasting (WRF) Model, WRF-Chem, WRFDA, and WRF Regional Climate Summer Tutorial at NCAR — Boulder, CO — Aug 2014
- ◇ The NCAR Command Language (NCL) workshop at NCAR — Boulder, CO — June 2015
- ◇ Iowa High Performance Computing (IHPC) Summer School — Iowa City, IA — May 2015

COLLABORATIONS AND OUTREACH

Weather and air quality forecasting support for field campaigns

- ◇ NASA/NOAA LMOS (2017), NASA ORACLES (2017), NASA KORUS-AQ (2016)

Post-campaign data analysis

- ◇ NASA/NOAA LMOS (2017), NASA ORACLES (2017), NSF/NCAR FRAPPÉ (2014), NASA DISCOVER-AQ (2014)

Peer review of journal

- ◇ ACP, JGR, ES&T, Elementa